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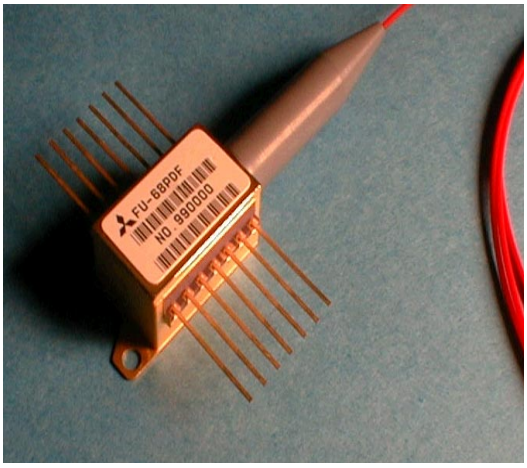
MITSUBISHI (OPTICAL DEVICES)

FU-68PDF-V510MxxB

1.55 μm DFB-LD MODULE WITH POLARIZATION MAINTAINING FIBER PIGTAIL (WAVELENGTH SELECTED, BIAS CIRCUIT INTEGRATED, DIGITAL APPLICATION)

DESCRIPTION

Module type FU-68PDF-V510MxxB is a 1.55μm DFB-LD module with polarization maintaining optical fiber.
This module is suitable to a CW light source for external modulator for use in 2.5Gb/s and 10Gb/s digital optical communication systems.
This module is prepared in accordance with ITU-T recommendation wavelength channel plan for Dense-WDM transmission.



FEATURES

- Input impedance is 25Ω
- Multi quantum wells (MQW) DFB Laser Diode module
- Emission wavelength is in 1.55μm band
- Polarization maintaining optical fiber pig-tail
- Built-in optical isolator
- Built-in thermal electric cooler
- Butterfly package
- With photodiode for optical output monitor

APPLICATION

High speed transmission systems (~10Gb/s)
Dense-WDM systems

ABSOLUTE MAXIMUM RATINGS (Tld=Tset)

Parameter		Symbol	Conditions	Rating	Unit
Laser diode	Optical output power	Pf	CW	15	mW
	Forward current	If	CW	150	mA
	Reverse voltage	Vrl	–	2	V
Photodiode	Reverse voltage	Vrd	–	20	V
	Forward current	Ifd	–	2	mA
Thermo-electric cooler (Note)	Cooler current	Ipe	–	1.3	A
	Cooler voltage	Vpe	–	3.1	V
Operating case temperature		Tc	–	-20 ~ 70	°C
Storage temperature		Tstg	–	-40 ~ 85	°C

Note) Even if the thermo-electric cooler (TEC) is operated within the rated conditions, uncontrolled current loading or operation without heatsink may easily damage the module by exceeding the storage temperature range. Thermistor resistance should be properly monitored by the feedback circuit during TEC operation to avoid the catastrophic damage.

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ELECTRICAL/OPTICAL CHARACTERISTICS (Tld=Tset, Tc=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Threshold current	Ith	CW	-	10	25	mA
Operating current	Iop	CW, Pf=10mW	-	-	100	mA
Operating voltage	Vop	CW, Pf=10mW	-	-	1.8	V
Input impedance	Zin	Pf=10mW	-	25	-	Ω
Light-emission central wavelength	λc	CW, Pf=10mW	(Note 1)			nm
Central wavelength drift with case temp.	Δλc/ΔTc	Tc=-20~70°C	-1	-	0	pm/°C
Laser operating temperature	Tset	-	20	-	35	°C
Spectral line width	Δf	CW, Pf=10mW	-	-	20	MHz
Side mode suppression ratio	Sr	CW, Pf=10mW	33	40	-	dB
Cutoff frequency (-1.5dB optical)	fc	Pf=10mW	2	-	-	GHz
Polarization extinction ratio	Ex	CW, Pf=10mW	20	25	-	dB
Relative intensity noise	Nr	CW, Pf=10mW, 0.5~3GHz	-	-155	-145	dB/Hz
Tracking error (Note 2)	Er	Tc=-20~70°C, APC, ATC	-	-	0.5	dB
Differential efficiency	η	CW, Pf=10mW	0.1	-	-	mW/mA
Monitor current	Imon	CW, Pf=10mW, Vrd=5V	0.2	-	2	mA
Optical isolation	Iso	Tc=25°C	35	-	-	dB
		Tc=-20~70°C	23	-	-	
Dark current (PD)	Id	Vrd=5V, Tc=-20~70°C	-	-	0.1	μA
Capacitance (PD)	Ct	Vrd=5V, f=1MHz	-	-	10	pF

Note 1) See Table 1.

Note 2) Er=max|10×log(Pf / Pf@25°C)|

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THERMAL CHARACTERISTICS (Tld=Tset, Tc=-20~70°C)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Thermistor resistance	Rth	Tld=25℃	9.5	10	10.5	kΩ
B constant of Rth	B	-	-	3950	-	K
Cooling capacity	ΔT	Pf=10mW, Tc=70°C	50	-	-	°C
Cooler current	Ipe	Pf=10mW, Tc=70°C, Tld=Tset	-	0.6	1	A
Cooler voltage	Vpe	Pf=10mW, Tc=70°C, Tld=Tset	-	1.2	2	V

FIBER PIGTAIL SPECIFICATIONS

Parameter	Limits	Unit
Type	PM (Note 3)	-
Mode field diameter	11±1	μm
Cladding diameter	125±3	μm
Secondary coating outer diameter	0.9±0.1	mm
Polarization axis	slow axis	-
Connector	FC/PC	-
Optical return loss of connector	40 (min)	dB

Note 3) PMF - Sumitomo Panda fiber (PM-155)

DOCUMENTATION (Tld=Tset)

- Fiber output power vs. Laser forward current at Tld=Tset and Tc=-20,25,70°C
- Threshold current (Ith)
- Laser forward current (Iop) at Pf=10mW
- Laser forward voltage (Vop) at Pf=10mW
- Laser operating temperature (Tset) at λc (Note 4)
- Monitor current (Imon) at Pf=10mW
- Thermistor resistance (Rth)
- Cooler current (Ipe) at Pf=10mW and Tc=70°C
- Cooler voltage (Vpe) at Pf=10mW and Tc=70°C

Note 4) Tset is attached as a reference data. Rth should be used in order to tune the wavelength to the specified value accurately.

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1.55 μm DFB-LD MODULE WITH POLARIZATION MAINTAINING FIBER PIGTAIL (WAVELENGTH SELECTED, BIAS CIRCUIT INTEGRATED, DIGITAL APPLICATION)

Table 1.

Type number	λc (nm)	Type number	λc (nm)	Type number	λc (nm)
FU-68PDF-510M9B	1529.55	FU-68PDF-510M38B	1540.95	FU-68PDF-510M67B	1552.52
FU-68PDF-510M10B	1529.94	FU-68PDF-510M39B	1541.35	FU-68PDF-510M68B	1552.93
FU-68PDF-510M11B	1530.33	FU-68PDF-510M40B	1541.75	FU-68PDF-510M69B	1553.33
FU-68PDF-510M12B	1530.72	FU-68PDF-510M41B	1542.14	FU-68PDF-510M70B	1553.73
FU-68PDF-510M13B	1531.12	FU-68PDF-510M42B	1542.54	FU-68PDF-510M71B	1554.13
FU-68PDF-510M14B	1531.51	FU-68PDF-510M43B	1542.94	FU-68PDF-510M72B	1554.54
FU-68PDF-510M15B	1531.90	FU-68PDF-510M44B	1543.33	FU-68PDF-510M73B	1554.94
FU-68PDF-510M16B	1532.29	FU-68PDF-510M45B	1543.73	FU-68PDF-510M74B	1555.34
FU-68PDF-510M17B	1532.68	FU-68PDF-510M46B	1544.13	FU-68PDF-510M75B	1555.75
FU-68PDF-510M18B	1533.07	FU-68PDF-510M47B	1544.53	FU-68PDF-510M76B	1556.15
FU-68PDF-510M19B	1533.47	FU-68PDF-510M48B	1544.92	FU-68PDF-510M77B	1556.55
FU-68PDF-510M20B	1533.86	FU-68PDF-510M49B	1545.32	FU-68PDF-510M78B	1556.96
FU-68PDF-510M21B	1534.25	FU-68PDF-510M50B	1545.72	FU-68PDF-510M79B	1557.36
FU-68PDF-510M22B	1534.64	FU-68PDF-510M51B	1546.12	FU-68PDF-510M80B	1557.77
FU-68PDF-510M23B	1535.04	FU-68PDF-510M52B	1546.52	FU-68PDF-510M81B	1558.17
FU-68PDF-510M24B	1535.43	FU-68PDF-510M53B	1546.92	FU-68PDF-510M82B	1558.58
FU-68PDF-510M25B	1535.82	FU-68PDF-510M54B	1547.32	FU-68PDF-510M83B	1558.98
FU-68PDF-510M26B	1536.22	FU-68PDF-510M55B	1547.72	FU-68PDF-510M84B	1559.39
FU-68PDF-510M27B	1536.61	FU-68PDF-510M56B	1548.11	FU-68PDF-510M85B	1559.79
FU-68PDF-510M28B	1537.00	FU-68PDF-510M57B	1548.51	FU-68PDF-510M86B	1560.20
FU-68PDF-510M29B	1537.40	FU-68PDF-510M58B	1548.91	FU-68PDF-510M87B	1560.61
FU-68PDF-510M30B	1537.79	FU-68PDF-510M59B	1549.32	FU-68PDF-510M88B	1561.01
FU-68PDF-510M31B	1538.19	FU-68PDF-510M60B	1549.72	FU-68PDF-510M89B	1561.42
FU-68PDF-510M32B	1538.58	FU-68PDF-510M61B	1550.12	FU-68PDF-510M90B	1561.83
FU-68PDF-510M33B	1538.98	FU-68PDF-510M62B	1550.52	FU-68PDF-510M91B	1562.23
FU-68PDF-510M34B	1539.37	FU-68PDF-510M63B	1550.92	FU-68PDF-510M92B	1562.64
FU-68PDF-510M35B	1539.77	FU-68PDF-510M64B	1551.32	FU-68PDF-510M93B	1563.05
FU-68PDF-510M36B	1540.16	FU-68PDF-510M65B	1551.72	FU-68PDF-510M94B	1563.45
FU-68PDF-510M37B	1540.56	FU-68PDF-510M66B	1552.12	FU-68PDF-510M95B	1563.86

All wavelengths are referred to vacuum.

Tolerance is λc ± 0.05nm.

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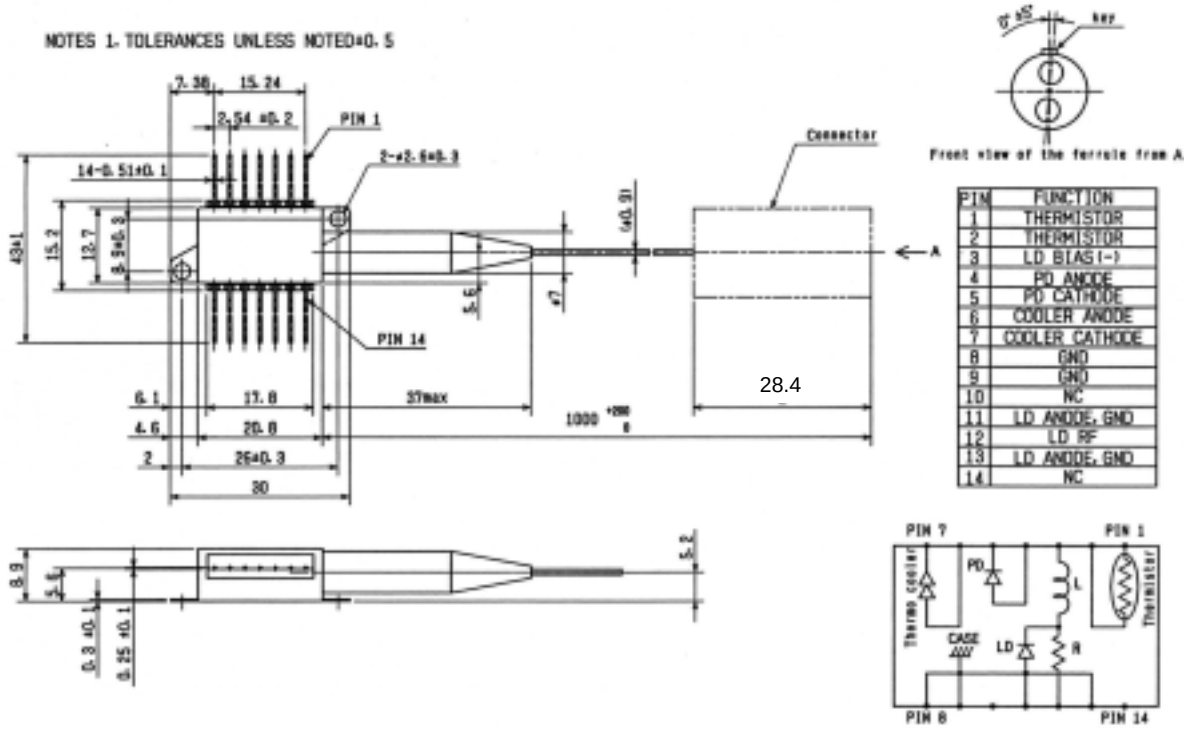
OUTLINE DIAGRAM

(Unit : mm)



PIN	FUNCTION
1	THERMISTOR
2	THERMISTOR
3	LD BIAS(-)
4	PD ANODE
5	PD CATHODE
6	COOLER ANODE
7	COOLER CATHODE
8	GND
9	GND
10	NC
11	LD ANODE, GND
12	LD RF
13	LD ANODE, GND
14	NC

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